

**WHAT IS CLAIMED IS:**

1. A method for enabling a traffic flow control down to all sub-ports of a switching function made of a N-port core switch fabric, said switching function comprising one or more port adapters, each said port adapter including one or more sub-port adapters, said method comprising the steps of:
  - in each said sub-port adapter;
  - detecting congestion in an OUT leg of said sub-port adapter;
  - reporting said detected congestion through an IN leg of said sub-port adapter, said step of reporting further including the step of:
    - piggyback conveying said detected congestion over an incoming traffic entering an input port of said N-port core switching fabric from said IN leg of said sub-port adapter;
  - in said N-port core switch fabric:
    - broadcasting said detected congestion to all output ports;
  - in each said port adapter,
  - broadcasting said detected congestion to all sub-ports, thereby informing all said sub-port adapters of a said detected congestion in any one of said OUT leg.

- 1           2.     The method of claim 1 further comprising the steps of:
- 2                 in each said sub-port adapter, checking whether said OUT leg of a Nth sub-port
- 3                 adapter is reported to be congested or not;
- 4                 if congested, stop forwarding traffic destined for said OUT leg of said Nth sub-
- 5                 port adapter, said stopping step further comprising the step of:
- 6                 holding traffic in said sub-port adapter if any is received;
- 7                 if not congested, continue or resume forwarding traffic, if any received, destined
- 8                 for said OUT leg of said sub-port adapter;
- 9                 continuing to cycle through each reported said sub-port adapter repeating all here
- 10                above described steps.
- 1           3.     The method of claim 1 wherein said N-port core switch fabric is switching fixed-
- 2                 size packets.
- 1           4.     The method of claim 3 wherein said fixed-size packets, moved through the ports
- 2                 of
- 3                 said N-port core switch fabric, include fixed-size idle packets.
- 1           5.     The method of claim 3 wherein more than a single said fixed-size packet are
- 2                 moved simultaneously through each port of said N-port core switch fabric.
- 1           6.     The method of claim 3 wherein the step of piggyback conveying said detected

2 congestion is performed in a header field of said fixed-size packets.

1 7. The method of claim 4 wherein the step of piggyback conveying said detected  
2 congestion over said incoming traffic is carried out including said fixed-size idle  
3 packet.

1 8. The method of claim 6 wherein the step of reporting said detected congestion of  
2 all  
3 said sub-port adapters is time multiplexed in said header field.

1 9. The method of claim 1 wherein the reporting step includes reporting per priority  
2 class.

1 10. A switching system expanding the number of ports of a switch fabric comprising;  
2 a N-port core switch fabric,  
3 one or more port adapters, each said port adapter including one or more sub-port  
4 adapters,  
5 in each said sub-port adapter;  
6 means for detecting congestion in an OUT leg of said sub-port adapter;  
7 means for reporting said detected congestion through an IN leg of said sub-port  
8 adapter, said reporting means further comprising:

means for piggyback conveying said detected congestion over an incoming traffic entering an input port of said N-port core switching fabric from said IN leg of said sub-port adapter;

in said N-port core switch fabric:

means for broadcasting said detected congestion to all output ports;

in each said port adapter,

means for broadcasting said detected congestion to all sub-ports, thereby informing all said sub-port adapters of a said detected congestion in any one of said OUT leg.

11. The switching system of claim 10 further comprising :

in each said sub-port adapter, means for checking whether said OUT leg of a Nth sub-port adapter is reported to be congested or not;

if congested, means to stop forwarding traffic destined for said OUT leg of said Nth sub-port adapter, said stopping means further comprising,

means for holding traffic in said sub-port adapter if any is received;

if not congested, means to continue or resume forwarding traffic, if any received, destined for said OUT leg of said sub-port adapter;

means for continuing to cycle through each reported said sub-port adapter repeating all here above described steps.

12. The switching system of claim 10 wherein said N-port core switch fabric is

2 switching fixed-size packets.

1 13. The switching system of claim 12 wherein said fixed-size packets, moved through  
2 the ports of said N-port core switch fabric, include fixed-size idle packets.

1 14. The switching system of claim 12 wherein more than a single said fixed-size  
2 packet are moved simultaneously through each port of said N-port core switch  
3 fabric.

1 15. The switching system of claim 12 wherein said means for piggyback conveying  
2 said detected congestion is performed in a header field of said fixed-size packets.

1 16. The switching system of claim 13 wherein said means for piggyback conveying  
2 said detected congestion over said incoming traffic is carried out including said  
3 fixed-size idle packet.

1 17. The switching system of claim 15 wherein said means for reporting said detected  
2 congestion of all said sub-port adapters is time multiplexed in said header field.

1 18. The switching system of claim 10 wherein said reporting means includes reporting  
2 per priority class.

1 19. A program storage device readable by a machine, tangibly embodying a program  
2 of instructions executable by the machine to perform method steps for enabling a  
3 traffic flow control down to all sub-ports of a switching function  
4 made of a N-port core switch fabric, said switching function comprising one or  
5 more port adapters, each said port adapter including one or more sub-port  
6 adapters, said method steps comprising:  
7 in each said sub-port adapter;  
8 detecting congestion in an OUT leg of said sub-port adapter;  
9 reporting said detected congestion through an IN leg of said sub-port adapter, said  
10 step of reporting further including the step of:  
11 piggyback conveying said detected congestion over an incoming traffic entering  
12 an input port of said N-port core switching fabric from said IN leg of said sub-port  
13 adapter;  
14 in said N-port core switch fabric:  
15 broadcasting said detected congestion to all output ports;  
16 in each said port adapter,  
17 broadcasting said detected congestion to all sub-ports, thereby informing all said  
18 sub-port adapters of a said detected congestion in any one of said OUT leg.

1 20. The program storage device of claim 19 further comprising the steps of:  
2 in each said sub-port adapter, checking whether said OUT leg of a Nth sub-port

3 adapter is reported to be congested or not;  
4 if congested, stop forwarding traffic destined for said OUT leg of said Nth sub-  
5 port adapter, said stopping step further comprising the step of:  
6 holding traffic in said sub-port adapter if any is received;  
7 if not congested, continue or resume forwarding traffic, if any received, destined  
8 for said OUT leg of said sub-port adapter;  
9 continuing to cycle through each reported said sub-port adapter repeating all here  
10 above described steps.

1 21. The program storage device of claim 19 wherein said N-port core switch fabric is  
2 switching fixed-size packets.

1 22. The program storage device of claim 21 wherein said fixed-size packets, moved  
2 through the ports of said N-port core switch fabric, include fixed-size idle packets.

1 23. The program storage device of claim 21 wherein more than a single said fixed-  
2 size packet are moved simultaneously through each port of said N-port core  
3 switch fabric.

1 24. The program storage device of claim 21 wherein the step of piggyback conveying  
2 said detected congestion is performed in a header field of said fixed-size packets.

1 25. The program storage device of claim 22 wherein the step of piggyback conveying  
2 said detected congestion over said incoming traffic is carried out including said  
3 fixed-size idle packet.

1 26. The program storage device of claim 24 wherein the step of reporting said  
2 detected congestion of all said sub-port adapters is time multiplexed in said  
3 header field.

1 27. The program storage device of claim 19 wherein the reporting step includes  
2 reporting per priority class.